# Uranium detectable in two-thirds of US community water system monitoring records

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A study on metal concentrations in U.S. community water systems (CWS) and patterns of inequalities, researchers at Columbia University Mailman School of Public Health found that metal concentrations were

particularly elevated in CWSs serving semi-urban, Hispanic communities independent of location or region, highlighting environmental justice concerns. These communities had the highest levels of uranium, selenium, barium, chromium, and arsenic concentrations.

Even at low concentrations, uranium in particular represents an important risk factor for the development of chronic diseases. Until now little epidemiological research had been done on chronic water uranium exposures despite the potential health effects of uranium exposure from CWSs. Uranium in particular, has been underappreciated in the literature as a public drinking water contaminant of concern. The study results are published in the journal *The Lancet Planetary Health*.

"Previous studies have found associations between chronic uranium exposure and increased risk of hypertension, cardiovascular disease, kidney damage, and lung cancer at high levels of exposure," said Anne Nigra, Ph.D., assistant professor of Environmental Health Sciences at Columbia Mailman School of Public Health. "Our objectives were to estimate CWS metal concentrations across the U.S, and identify sociodemographic subgroups served by these systems that either reported high metal concentration estimates or were more likely to report averages exceeding the US EPA's maximum contaminant level (MCL)."

Approximately 90 percent of U.S. residents rely on public drinking water systems, with most residents relying specifically on community water systems that serve the same population year-round. The researchers evaluated six-year EPA review records for antimony, arsenic, barium, beryllium, cadmium, chromium, mercury, selenium, thallium, and uranium to determine if average concentrations exceeded the maximum contaminant levels set by the EPA which regulates levels for six classes of contaminants. This included approximately 13 million

records from 139,000 public water systems serving 290 million people annually. The researchers developed average metal concentrations for 37,915 CWSs across the country, and created an online interactive map of estimated metal concentrations at the CWS and county levels to use in future analyses.

According to findings 2·1 percent of community water systems reported average uranium concentrations from 2000 to 2011 in exceedance of the EPA maximum contamination levels, and uranium was frequently detected during compliance monitoring (63% of the time). Arsenic, barium, chromium, selenium, and uranium concentrations were also disproportionately elevated in CWSs serving semi-urban, Hispanic populations, raising concerns for these communities and the possibility of influencing inequalities in public drinking water.

Nigra and her colleagues note that the consistent association between elevated CWS metal concentrations and semi-urban, Hispanic communities implies that concentration disparities are a failure of regulatory policy or treatment rather than underlying geology. Hispanic/Latino populations show numerous health disparities including increased mortality due to diabetes, as well as liver, kidney, and cardiovascular disease.

"Additional regulatory policies, compliance enforcement, and improved infrastructure are therefore necessary to reduce disparities in CWS metal concentrations and protect communities served by public water systems with elevated metal concentrations," said Nigra. "Such interventions and policies should specifically protect the most highly exposed communities to advance environmental justice and protect public health.

Co-authors are Filippo Ravalli, Kathrin Schilling Yuanzhi Yu, and Ana Navas-Acien, Columbia University Mailman School of Public Health; Benjamin C Bostick, and Steven N Chillru, Lamont Doherty Earth

Observatory, Columbia University; and Anirban Basu, University of London.

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